PLEASE AMEND THE TITLE AS FOLLOWS:

Please replace the title with the following title:

GIANT MAGNETORESISTIVE (GMR) SENSOR ELEMENT WITH ENHANCED MAGNETORESISTIVE (MR) COEFFICIENT

PLEASE AMEND THE CLAIMS AS FOLLOWS:

Please cancel claim 2.

Please cancel claim 14.

Please amend claim 1 as follows:

Claim 1. (AMENDED) A method for forming a giant magnetoresistive (GMR) sensor element with an enhanced magnetoresistive coefficient comprising:

providing a substrate;

forming over the substrate a double-layer seed layer, said double layer comprising a first material layer selected from the group of magnetoresistive (MR) resistivity sensitivity enhancing material consisting of nickel-chromium alloys and nickel-iron-chromium alloys and said double-layer seed layer further comprising a second material layer, said material layer being a thin, non-magnetic dielectric nickel oxide material layer that additionally enhances magnetoresistive (MR) resistivity sensitivity;

forming over the double-layer seed layer a free ferromagnetic layer;

forming over the free ferromagnetic layer a non-magnetic conductor spacer layer;

forming over the non-magnetic conductor spacer layer a pinned ferromagnetic layer; and

forming over the pinned ferromagnetic layer a pinning material layer.

Please amend claim 4 as follows:

Claim ~~4~~ 3. (AMENDED) The method of claim 1 wherein the nickel oxide material layer, which is the second material layer of said double-layer seed layer, is formed to a thickness of from about 5 to about 15 ~~angstroms~~ as a non-magnetic dielectric nickel oxide material layer.

Please amend claim 6 as follows:

Claim ~~6~~ 5. (AMENDED) A giant magnetoresistive (GMR) sensor element with an enhanced magnetoresistive coefficient comprising:

a substrate;

a double-layer seed layer formed over the substrate, said double layer comprising a first material layer selected from the group of magnetoresistive (MR) resistivity sensitivity enhancing material consisting of nickel-chromium alloys and nickel-iron-chromium alloys and said double-layer seed layer further comprising a second material layer, said material layer being a thin, non-magnetic dielectric nickel oxide material layer that additionally enhances magnetoresistive (MR) resistivity sensitivity;

a free ferromagnetic layer formed over the double-layer seed layer;

a non-magnetic conductor spacer layer formed over the free ferromagnetic layer;

a pinned ferromagnetic layer formed over the non-magnetic conductor spacer layer; and

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a pinning material layer formed over the pinned ferromagnetic layer.

Please amend claim 8 as follows:

Claim ~~8~~ 7. (AMENDED) The giant magnetoresistive (GMR) sensor element of claim ~~6~~ 5 wherein the nickel oxide material layer, which is the second material layer of said double-layer seed layer, is formed to a thickness of from about 5 to about 15 angstroms as a non-magnetic dielectric nickel oxide material layer.

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Please amend claim 13 as follows:

Claim ~~13~~ 12. (AMENDED) A method for forming a spin valve magnetoresistive (SVMR) sensor element with an enhanced magnetoresistive coefficient comprising:

providing a substrate;

forming over the substrate a double-layer seed layer, said double layer comprising a first material layer selected from the group of magnetoresistive (MR) resistivity sensitivity enhancing material consisting of nickel-chromium alloys and nickel-iron-chromium alloys and said double-layer seed layer further comprising a second material layer, said material layer being a thin, non-magnetic dielectric nickel oxide material layer that additionally enhances magnetoresistive (MR) resistivity sensitivity;

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forming over the double-layer seedlayer a free ferromagnetic layer;

forming over the free ferromagnetic layer a non-magnetic conductor spacer layer;

forming over the non-magnetic conductor spacer layer a pinned ferromagnetic layer; and

forming over the pinned ferromagnetic layer a pinning material layer.

Please amend claim 15 as follows:

Claim 13. (AMENDED) The method of claim 12 wherein the nickel oxide material layer, which is the second material layer of said double-layer seed layer, is formed to a thickness of from about 5 to about 15 angstroms as a non-magnetic dielectric nickel oxide material layer.

Please amend claim 17 as follows:

Claim 15. (AMENDED) A spin valve magnetoresistive (SVMR) sensor element with an enhanced magnetoresistive coefficient comprising:

a substrate;

a double-layer seed layer formed over the substrate, said double layer comprising a first material layer selected from the group of magnetoresistive (MR) resistivity sensitivity enhancing material consisting of nickel-chromium alloys and nickel-iron-chromium alloys and said double-layer seed layer further comprising a second material layer, said material layer being a thin, non-magnetic dielectric nickel oxide material layer that additionally enhances magnetoresistive (MR) resistivity sensitivity;

a free ferromagnetic layer formed over the double-layer seed layer;

a non-magnetic conductor spacer layer formed over the free ferromagnetic layer;

a pinned ferromagnetic layer formed over the non-magnetic conductor spacer layer; and

a pinning material layer formed over the pinned ferromagnetic layer.

Please amend claim 18 as follows:

Claim ~~18~~ 16. (AMENDED) The spin valve magnetoresistive (SVMR) sensor element of claim ~~17~~ 15 wherein the nickel oxide material layer, which is the second material layer of said double-layer seed layer, is formed to a thickness of from about 5 to about 15 angstroms as a non-magnetic dielectric nickel oxide material layer.

REMARKS

The examiner is thanked for thoroughly reviewing the subject patent application. Briefly, Applicants wish to point out the major features of their invention, which is a method for forming a giant magnetoresistive sensor element with an enhanced magnetoresistive coefficient, together with the head so formed.

Although the method of the present invention can be applied to the formation of at least four different structural types of sensor elements, including spin valve magnetoresistive (SVMR) elements, synthetic antiferromagnetically biased giant magnetoresistive elements, simple spin filter sensor elements and spin filter synthetically